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Rental Price Dynamics of State-Owned Agricultural Land in Ukraine

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About the Project "German-Ukrainian Agricultural Policy Dialogue" (APD)

The project "German-Ukrainian Agricultural Policy Dialogue (APD)" has been implemented with the support of the Federal Ministry of Food and Agriculture (BMEL) since 2006 and is planned to run until 2021. While the implementing agency of BMEL's entire bilateral cooperation-program is GFA Consulting Group LLC, the APD-project in Ukraine is implemented by a consortium consisting of IAK Agrar Consulting, Leibniz Institute of Agricultural Development in Transition Economies (IAMO) and AFC Consultants International. The recipient of the project is the National Association of Agricultural Advisory Services of Ukraine "Dorada". The beneficiary of the project is the Ministry for Development of Economy, Trade and Agriculture of Ukraine (MDETA).

The project aims at supporting Ukraine in the areas of sustainable agriculture, efficient processing industry and international competitiveness in accordance with the principles of market and regulatory policies, taking into account the potential for development resulting from the Association Agreement between the EU and Ukraine. To meet this goal, the Project provides information on German, in particular Eastern German, experience and know-how, as well as on international European experience with regard to the development of an agrarian and forestry policy.

One of the components of APD – the land component – is managed by BVVG German AgriForest Privatization Agency, a state-owned enterprise that is responsible for the administration of state-owned agricultural and forestry land in (Eastern) Germany. Under the land component, the project offers an exchange of experience and know-how between Ukrainian and German land management experts from BVVG and additional German land management institutions. The land component focuses on political, legal and technical issues related to land management and accompanies the current discussions in Ukraine concerning land market development.

APD Deutsch-Ukrainischer Agrarpolitischer Dialog

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PREFACE

Since gaining independence, Ukraine has experienced major changes in the land sector. Until today, the question of lifting the moratorium on agricultural land sales is the key issue of the ongoing debate on land reform in Ukraine. Currently a number of accompanying reforms in land relations are planned and are likely to substantially change the institutional environment of the Ukrainian land relations. APD's land component seeks to support the Ukrainian decision-makers in these tasks. In particular, it facilitates the cooperation between German land management experts and Ukrainian experts from different institutions dealing with land reforms in Ukraine. A major objective of this cooperation is to create necessary preconditions for establishing a functioning land market in Ukraine. Addressing this issue, APD's land component has provided advice on the procedures of land transactions, the establishing of a functioning lease market, price formation for agricultural land, and institutional arrangements for effective land management. For many of the discussed issues, (Eastern) German experience with land reforms after reunification of the two German states has been useful in the process of finding solutions for the situation in Ukraine. BVVG, established in 1992 as state agency subordinated to the Ministry of Finance, was involved in the political discussions that centered on the restructuring of land tenure in rural areas of Eastern Germany with the aim to facilitate the development of an economic viable agricultural sector based on a heterogeneous land ownership structure. BVVG's experts were actively involved in the discussion and review of the so-called transitional laws that formed the legal basis for future land distribution, i.e. restitution, allocation to statutory bodies and privatization (selling). Moreover, due to its core mission of managing state-owned agricultural and forestland in the territory of the former GDR, BVVG held a large portfolio of land and was one of the key players on the (Eastern) German land market. Over time, BVVG has gained more and more experience in marketing state-owned land. A key consideration was to allocate state-owned land at market value. However, identifying potential market prices in an environment where a land market did not yet exist proved to be difficult.

Similar to the East German experience, Ukraine struggles to develop a functional mechanism to determine reference land values. Due to an absent land sales market, information on realistic land values in rural areas is not available in an aggregated and systematic way. Recently, the Ukrainian government attempted to provide more transparency in auctioning rental rights for state- and communally-owned land by systematically collecting and publishing rental prices. However, information on rental prices for private land is not available.

In line with the mission of APD's land component, a group of experts coordinated by the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) has analyzed publicly available data on land lease auctions (for state- and communally-owned land) conducted by the State Service of Ukraine for Geodesy, Cartography and Cadaster as well as local governments. The study presents the developments and highlights major

trends in lease price for public agricultural land during the last years. The authors also discuss some of the potential factors that may affect rental prices considering existing land-related institutions in Ukraine. One of the central implications of the study is that "land rental and sales markets require proper market monitoring and availability of price information to function properly".

BVVG's Foreign Advisory Expert Panel strongly supports the call to establish a comprehensive land price monitoring system. First, accessibility of price information helps private landowners to make informed decisions on renting or selling their land if they choose not to use it themselves. Second, potential land users require the information on price developments as well. Third, a prerequisite for making effective management decisions on renting or selling land in the portfolio of public institutions responsible for managing state- or communal land is the availability of information on land market trends. Moreover, regularly published market information allows the state to monitor land market developments and, if necessary, to take corrective measures based on existing land policy objectives. In the long run, it will not be sufficient to merely publish lease (and sales) prices. From our point of view it is also important to statistically analyze the factors that potentially may influence the price of a land plot in question (e.g. plot/lot size, location and soil quality). This study provides a first attempt to do so. In addition, Ukraine may consider the German experience where the statistical analysis of market prices is conducted by the so-called board of expert valuers (Gutachterausschüssen). BVVG recommends a similar institutional arrangement that facilitates independent data analysis and provides statistically processed market information.

BVVG's Foreign Advisory Expert Panel

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ACRONYMS

Amalgamated territorial community	ATC
Cabinet of Ministers of Ukraine	CMU
Consumer Price Index	CPI
Ministry of Justice	MoJ
Ministry of Agrarian Policy and Food	MAPF
Normative Monetary Valuation	NMV
State Service for Geodesy, Cartography and Cadaster	SGC
System of Electronic Trading with Arrested Property	SETAP
Ukrainian hryvnia	UAH
World Development Indicators	WDI

1 INTRODUCTION

Since autumn 2019, Ukraine has been in an active policy-making phase aiming at a further liberalization of land relations. Evidence-based policy advice that uses existing experience of Ukrainian land relations is expected to improve the basis and consequently the outcomes of political decision-making. Launching a sales market for agricultural land has been one of the major focal points of the Ukrainian public debate. This debate has recently focused on the design of institutions involved in the land market facilitation. Land-related institutions determine land rental and sales prices that represent an important information for land relations.

In the absence of a functional land sales market, the Ukrainian government determines land prices. Right after adoption of the 2001 Land Code, a moratorium on land sales was imposed taking away the right of ca. 6.92 million land owners to sell their land plots obtained during land distribution in the 90s. Since then, Ukrainian land relations have been developing almost exclusively on a rental basis. To be able to calculate land prices in a situation without land sales market and have a basis for land tax calculation, Ukrainian policy-makers developed a so called “normative monetary valuation” (NMV) of land. According to Ukrainian tax legislation, NMV represents the basis for calculation of rental payments for state and communal land. Moreover, in most cases, rental payments for private land are also determined using NMV. It is however important to understand that NMV is not formed by marked forces and may not reflect economic value of a certain plot which is formed based on the willingness to pay by potential users.

Despite the fact that rental has been the most important way to access agricultural land in Ukraine, we know very little about the way rental market functions. Because information about private land rental is not systematically collected and analyzed, any reasonable prediction of potential sales prices is difficult. Understanding current land price formation within the existing institutional environment that allows only land rental may provide a useful foundation for further policy design that would shape Ukrainian land relations.

A number of recent political developments have allowed rental of public land on more competitive terms and have systematically documented rental transactions. In particular, introduction of mandatory land auctioning in 2013 and implementation of a pilot project on electronic land auctioning in 2018 allowed a more transparent land rental. These circumstances allowed us to obtain publicly available data on state-owned agricultural land that has recently been rented out via both, traditional and online auctions. As a result, we can get an idea about the basic characteristics of the public land that has been rented out this way since 2013. Although it only represents ca. 2.3% of the 10.4 million ha of the state-owned land, it is nevertheless possible to analyze basic dynamics on the rental market of the state-owned land.

This study provides an overview of temporal and spatial land rental price developments over the last seven years across all Ukrainian oblasts. Furthermore, we conduct a first analysis of the determinants of rental prices. To achieve that, we utilize a Ukraine-wide dataset provided by the State Service of Ukraine for Geodesy, Cartography and Cadaster (SGC) on auctioning land rental rights from 2013 until the end of 2019. The remainder of the study is organized in the following fashion. First, we describe the institutional context of renting out state-owned land in Section 2. Then, we briefly present the data in the Section 3. Based on the descriptive data analysis, Section 4 presents the dynamics of auctions and respective rental contracts as well as provides an overview of land rental prices and provides clues about the demand for auctioned land. Section 5 presents the results of econometric models estimating the influence of factors that may affect land rental prices and the markup generated by auctioning procedures. Section 6 concludes and provides a brief discussion.

2 INSTITUTIONAL CONTEXT

The amount of state-owned land in Ukraine has been steadily decreasing since the independence in 1991. The largest decrease was associated with the distribution of land certificates in the 90s when ca. 31 million ha were transferred into private ownership. This generated 6.92 million private land owners who were not able to dispose their property due to a land sales moratorium imposed right after adoption of the Land Code in 2001.

Because of the absence of a land sales market, no market-based price formation was possible. In response to this, the government passed a Law on Land Valuation in 2004 proposing a methodology to estimate so called "Normative monetary valuation" (NMV) of land which represents a land value assessment. It was supposed to be conducted every 5-7 years by land surveyors licensed by the SGC.[1] However, in practice until 2019, NMV was only revised based on the consumer price index (CPI). New NMV came into effect three years later based on a methodology approved by the government in 2016.

Another important stipulation in the Ukrainian Land Code that gradually continues to reduce the stock of state-owned land is that each citizen has a right to obtain into private ownership a land plot not larger than two ha for individual subsistence farming. These land plots are not subject to the moratorium and could be freely sold or purchased generating a land market with a limited supply of land. Between 2013 and 2018, SGC has allocated 394.2 thousand ha into private ownership (Accounting Chamber of Ukraine, 2018). This highly disputed provision puts state authorities in a difficult position in making decisions about distributing scarce state-owned land to a large number of individuals. In practice, the authorities limit access to land in different ways that have a potential for litigation. These law inconsistencies may give rise to substantial misuse. It is evident that

[1] Valuation methodology was revised in 2016. The main publicly available factors that affect NMV are pre-set average monetary value generated by a given land area and an average soil quality of a given area. However, land quality of a concrete land plot was supposed to be evaluated by land surveyors.

an analysis of allocation patterns and consequent sales of land acquired via this mechanism would be very desirable. However, due to lack of data, it is impossible to analyze these trends at this time.

The Law on Land Rental from 1998 regulates rental of both, public and private land. This law stipulates that agricultural land cannot be rented for periods more than 50 years. Rental contracts are normally registered in the State Land Cadaster of the SGC and in the State Registry of Property Rights, run by the Ministry of Justice (MoJ). Neither of these registries contain information on the rental price, making price monitoring nearly impossible.

Transparency of state-owned land management has improved considerably over the last years. An important amendment of the Land Code from July 5, 2012 stipulated that rental rights for agricultural land can be acquired only via an English auction procedure. This means that, based on a suggested opening price, auction participants were expected to make gradually increasing open bids until no other participant offers a higher bid. The last remaining bidder wins the auction and pays the last price announced. Auctioneers could be private or state-owned firms that act based on agreement with the auction initiator. Auction participants could be both, individuals and legal entities interested in renting a given land plot.

The procedures of land auctions, including setting the starting price, is regulated according to the amendments of the Land Code from July 5th, 2012. In particular, the starting price cannot be less than the rental price defined by the Land Code which corresponds to 0.3% of the NMV. However, the auction initiator has substantial discretion in setting the starting price above this threshold. Auctions have to be attended by at least two bidders to be recognized as successful. All bidders have to pay so called registration and guarantee contributions. The former is set by an auctioneer and it cannot be higher than 50% of the minimum monthly wage. The latter should be set at 5% of the yearly rental payment. Guarantee contributions are returned to all bidders who were not recognized as auction winners.

Introduction of mandatory land auctioning reduced the possibility of the state authorities to distribute land rental rights in a discretionary way. This measure was expected to improve transparency in state-owned land plots rental and, as a result, improve public revenues from land rental. Later, the Cabinet of Ministers' launched a "pilot project" of using online auctions for granting land rental rights on the basis of the Resolution No. 688 from June 21, 2017. The period between adoption of the Resolution and October 15, 2019 was considered a test period and the Ministry of Agrarian Policy and Food (MAPF) was expected to analyze the results of the pilot project. Electronic auctions were supposed to improve participants' access to the bidding processes and, thus, boost competition for land. In the light of this, it is important to note that the procedure for acquiring land rights, according to the Constitution of Ukraine, can be determined exclusively by law, which contradicts auctioning land rental rights based on a "pilot project" launched

by the CMU. As a result, the winners of electronic land auctions could consider the risk associated with legal uncertainties of the new way of concluding rental agreements and demonstrate a lower willingness to pay. As a result, this may negatively affect final rental prices for the online auctions conducted within the pilot project mentioned above.

Because land relations that are almost exclusively based on land rental may introduce substantial transaction costs for the tenants, Ukrainian legislators have introduced a minimum rental period. Agricultural enterprises working on large areas of land may need to invest substantial resources in maintaining access to the cultivated land from both, state and private land owners (Kvartiuk & Herzfeld, 2019). To provide a certain degree of stability and increase the planning horizon for the agricultural enterprises, a minimum rental period of seven years was introduced by an amendment of the Law on Land Rent passed on February 12, 2015. Another goal of this legal initiative was to improve investment in agriculture by providing a longer planning horizon.

Finally, ongoing decentralization reforms have contributed to a growing amount of communal land in the possession of local governments. In particular, on January 31, 2018 Cabinet of Ministers of Ukraine (CMU) adopted a Resolution No. 60-r that stipulated a transfer of state-owned agricultural land to Amalgamated territorial communities (ATCs). The process of transfer was coordinated by the SGC with minimal participation of the ATCs. As a result, local governments obtained a right to manage some of the communal land situated on its territory. Consequently, we should observe land auctions initiated by the SGC as well as by ATCs starting with 2018.

3 RESULTS OF AUCTIONING RENTAL CONTRACTS FOR STATE-OWNED AGRICULTURAL LAND

3.1 Utilized data

Because land prices in Ukraine are not recorded systematically and are not made easily available, land market monitoring is complicated. We do not have access to information on the current contracts. However, due to mandatory auctioning of public land since 2013 which also includes maintaining a respective database, we can get an idea about all newly signed contracts since 2013. This data provides information on basic land plot characteristics, NMV, duration of the contract and some characteristics of the auctioning procedures for all auctions conducted. However, a number of important pieces of information are missing. For instance, the number of participants is not disclosed in a systematic way and no information is provided on contract recipients. The dataset that we were able to access contains a total of 28,065 observations on the level of lots[2] and covers a period from April 30, 2013 till September 18, 2019. Out of total auctioned land we mostly work with 20,067 lots that are related to agricultural land rental and were identified based on available Classification of Land Use Purposes (CLUP) adopted on November 1, 2010.

[2] We refer to "lots" in the sense of auction lots.

Moreover, it is important to point out that in 2018 and 2019 we observe auctions initiated by both SGC and ATCs due to decentralization reforms mentioned in the previous section.

We ensured temporal comparability using deflators based on consumer price indices (CPI). We deflated all the variables referring to monetary values using 2018 as a base year with the help of the World Bank's World Development Indicators (WDI). As a result, the prices reported within the study are expressed in real 2018 Ukrainian hryvnia (UAH).

3.2 Auctions conducted

The success rate of the auctions of state-owned agricultural land is rather modest. Our dataset contains 12,842 successfully auctioned lots (67.5%) of agricultural land during 5,077 auctions. The rest (32.5%) represent the cases when i) auctions did not take place (21.6%), mostly because less than two bidders were present, ii) when auction results were cancelled after it was conducted because winners refused to either sign a contract or pay the amount agreed (8.3%), and iii) some auctions were cancelled before taking place (2.7%). Table 1 provides an overview of the reasons for each of the category of unsuccessful auctions. We see that a major reason for an auction not to take place (one out of five) is absence of competition for land.[3] In particular, an official reason given in the SGC dataset is the presence of less than two potential bidders at the auction, which lead to the cancellation of the auction. In the rest of the cases when auctions did not take place two options are possible: none of the auction participants raised their bids above the starting price (5.8%) or winners refused to sign auction protocol (4%). Even if the auction was recognized as a successful one there is no guarantee that the results will not be cancelled because in 8.3% of the times we observe winners refusing signing the contract or even paying the amount agreed. As a result, lack of demand by more than one actor is a major challenge for Ukrainian land rental auctions.

Table 1. Reasons for unsuccessful auction.

Auction did not take place (21.6%)	**Auction results cancelled (8.3%)**	**Auction cancelled with-out taking place (2.6%)**
- Presence of less than two participants (90.2%)	- Winner did not pay the amount agreed (53.2%)	- Order of the SGC (72.8%)
- None of the participants offered a bid higher than the starting price (5.8%)	- Winner refused signing contract (46.8%)	- Court decision (24.5%)
- Winner did not sign the auction protocol (4%)		- Other (2.7%)

[3] Importantly, presence of two participants may not imply competition as they may collude. However, absence of at least two participants provides us with a conservative idea about the degree of competition for the state-owned land.

3.3 Volumes of land auctioned

Since auctioning of state-owned land became mandatory, ca. 242 thousand ha (2.3% of the total state-owned land) have been successfully auctioned. Figure 1 demonstrates the dynamics of the areas auctioned since 2013. We see that during 2013 and 2014 small amounts of land were auctioned because these years may represent more of a piloting years when the auction procedures were tested. Only 30 successful auctions with 79 agricultural land plots (2.7 thousand ha) took place in 2013 with the highest number of land plots auctioned in Volyn (34.2%), Poltava (17.7%), and Chernihiv (11.4%) oblasts. In 2014 the total number of successfully auctioned plots jumped to 340 (8.5 thousand ha). The vast majority of the auctions took place in Odesa (33.8%) and Poltava (31.8%) oblasts. However, starting with 2015 we observe a steady increase reaching almost 67 thousand ha successfully auctioned in 2018 (in 1,498 auctions covering 3,563 plots).

Despite the adoption of CMU's Resolution in 2017, online auctions gained in popularity only in 2019. Only 4 thousand ha (185 lots via 84 auctions) were auctioned via online platforms in 2018 whereas in 2019 this figure skyrocketed up to 36.5 thousand ha (2,050 lots via 1,150 auctions), basically substituting traditional auctions.[4] With the exception of a few cases, all online auctions were conducted using the online platform designed and provided by the state enterprise "System of Electronic Trading with Arrested Property" (SETAP).

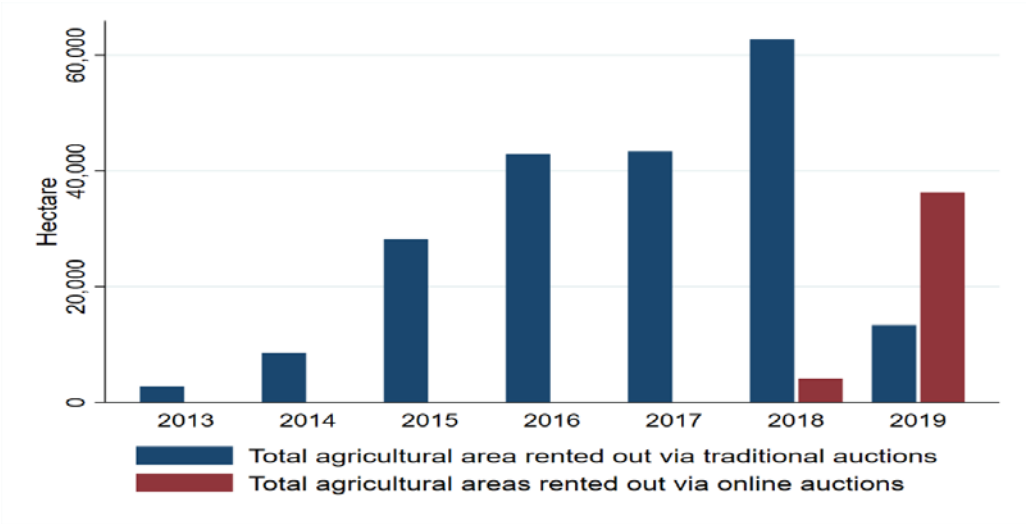

Figure 1. State-owned land auctioned via traditional and online auctions in Ukraine (ha).

[4] Please, consult Appendix B for a graph but with number of lots auctioned each year.

According to Figure 2, the total land auctioned is not evenly distributed across Ukraine. We find that Chernihiv, Sumy, Odesa and Mykolayiv regions have auctioned more than 15 thousand ha. On the other hand, Kyiv, Zakarpattia, Ivano-Frankivsk, Chernivtsi and Zaporizshia regions have auctioned less than 3.3 thousand ha since 2013. For the Western regions, structural differences in plot sizes may explain low levels of auctioned land. However, Kyiv and Zaporiszhia oblasts appear to be outliers for reasons that our data cannot reveal at this point.

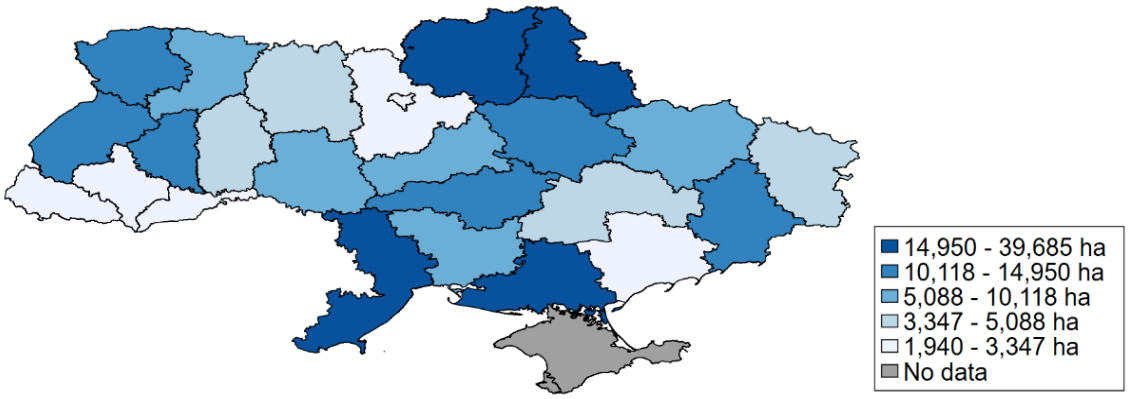

Figure 2. Distribution of successfully auctioned land (traditional and online auctions).

3.4 Length of rental contracts

The length of rental contracts has decreased substantially over the last years. Figure 3 presents the dynamics of average lengths. We see that state-owned agricultural land was auctioned for an average of 19.4 years during the period of 2013-2015. Interestingly, we see a hike in the average length of rental contracts in 2014 before adoption of the regulation of the contract length in 2015. Thus, 62.4% of the contracts in 2014 were of 30 years or longer. Two explanations for this hike are possible. First, uncertainty with respect to this regulation a year before may have pushed land users to lobby for longer contracts. During this year in 72.6% of the cases local governments were auction initiators whereas the rest of the auctions was initiated by the SGC. Second, anticipation of state land auctioning on a large scale and on competitive terms after 2014 may have incentivized local governments as well as SGC to rent out certain land plots for longer periods.

After 2014, we observe a roughly twofold drop in length of rental contracts with consequent stabilization at an average of 8.5 years. Among other factors, shorter contract lengths may indicate increased competition for land. Remarkably, despite the 2015 amendment that introduced minimum seven-year rental, we find nine one-year contracts and nine five-year contracts that were awarded via traditional auctions.[5] Among online

[5] These contracts were awarded in ten different oblasts and do not have any spatial pattern.

auctions, we do not find any contracts awarded for less than seven years as stipulated by the regulation. In fact, a vast majority (97.1%) of contracts for land rented out via online auctions were awarded for seven years. The rest of the contracts had a duration of ten years.

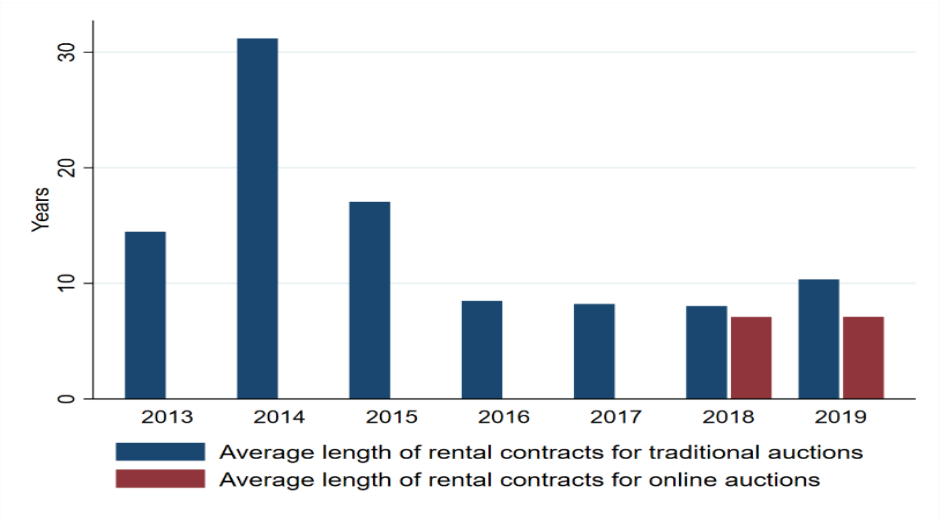

Figure 3. Average length for rental contracts by year.

3.5 Land rental prices during the period 2013-2019

Except for a major price hike between 2015 and 2016, we observe relatively stable average prices of 3659 UAH per ha during the last three years. Figure 4 demonstrates the dynamics of the countrywide average yearly rental prices for state-owned agricultural land. The only statistically significant increases in rental prices with respect to the previous year is observed in 2016 with 1,384 UAH or 67.3% increase with respect to the 2015 rental price[6] and a small increase of 213 UAH[7] (6% increase with respect to the 2018 rental price for traditional and online auctions) in 2019. For the rest of the years the year-to-year differences were not significant. Interestingly, for traditional auctions we observe a significant (p-value is 0.0000) 1,159 UAH increase in rental price between 2018 and 2019. However, because of the average 392 UAH drop in average rental price for online auctions between 2018 and 2019, which skyrocket in numbers, the average increase in rental prices for both types of auctions combined is much more modest than for traditional auctions only.

According to economic theory, the potential use of a certain plot should determine its economic value. Thus, plots in less favorable locations (e.g. lower soil quality, unfavorable level and distribution of rainfall) as well as with limited opportunities of use should be characterized by lower rental prices. This expectation is supported by the auction results for Ukraine. We observe some differences in rental prices for land designated for different use purposes. Thus, land plots designated for hayfields and pastures were on average

[6] P-value of the one-sided t-test for a comparison between the rental prices in 2015 and 2016 is 0.0000.
[7] P-value of the one-sided t-test for a comparison between the rental prices in 2018 and 2019 is 0.0651.

2,096 UAH cheaper in comparison to arable land.8 We came across only 44 successfully auctioned hayfields and pastures with rental price averaging 1,312 UAH per ha. Furthermore, we found 10 land plots auctioned for gardening purposes (codes 01.05 and 01.06 of the Classification of Land Use Types adopted by the SGC[9] on 01.10.2010). Counter to our expectation, the rental price for gardening land was not higher in comparison to other types of agricultural land and totaled 2,901 UAH per ha throughout the periods of our interest. Interestingly, rental contracts for the land plots for gardening were on average stipulated for 27.5 years which reflects the fact that gardening requires longer planning horizon.

We do not find any statistical difference between the prices that resulted from traditional and online auctions in 2018. However, the number of online auctions conducted in 2018 is insufficient to examine a statistical relationship in a meaningful way. Interestingly, average prices resulted from online auctions in 2019 were actually 1,518 UAH per ha lower than the prices for traditional auctions. This difference may be explained by the fact that the NMV of the plots put for online auctions in 2019 was 24.2 thousand UAH/ha lower than the NMV of the plots put for traditional auctions. Consequently, starting rental price for online auctions was on average 1,041 UAH/ha lower than the one for traditional auctions. It is noteworthy that nearly all online auctions were conducted by the SGC in 2019. As a result, it appears that SGC rented out land plots with lower NMV via online auctions.

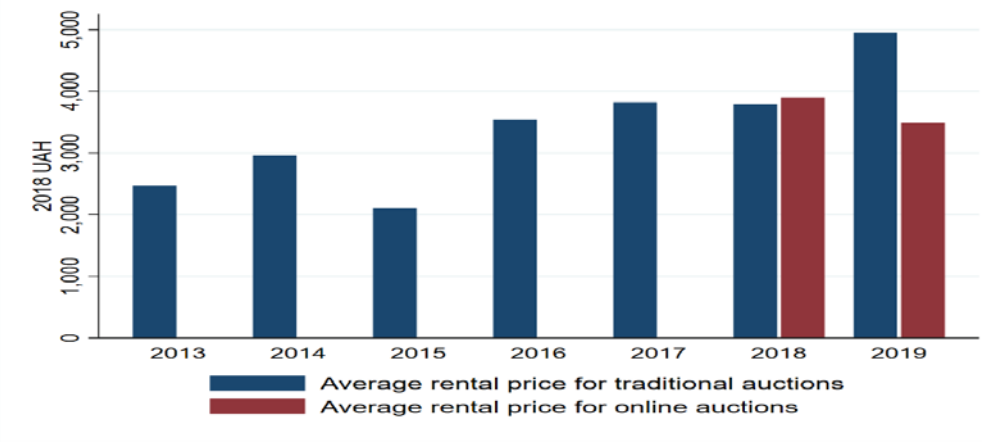

Figure 4. Average rental prices during 2013-2019 (in 2018 UAH).

3.6 Distribution of rental prices of state-owned agricultural land

Figure 5 demonstrates the spatial distribution of rental prices of public agricultural land. Central Ukrainian oblasts appear to have the highest final rental prices for successfully auctioned land. For instance, the record average 7,526 UAH per ha were recorded in Poltava, 5,556 UAH per ha in Vinnytsia, and 4,768 UAH per ha in Khmelnytskyy oblasts. We find that Volyn oblast held a record in 2018 in the lowest rent with average 1,921

[8] The NMV of hayfields and pastures is typically lower than the NMV of arable land.
[9] Back then by the State Committee of Ukraine for Land Resources.

UAH per ha. It was followed by Zhytomyr (2,147 UAH per ha), Sumy (2,223 UAH per ha), and Luhansk (2,224 UAH per ha) oblasts. We generally see lower rental prices in the northern parts of the country due to the climatic conditions and consequently lower intensity of agriculture. The prices in Donetsk and Luhansk oblasts might be affected by the uncertainties related to the territories temporarily occupied by Russia.

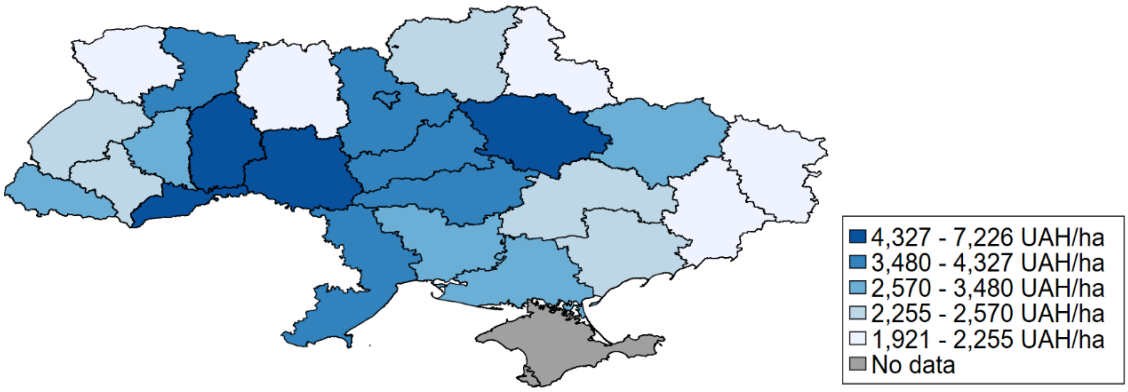

Figure 5. Distribution of rental prices in 2018 (in 2018 UAH).

3.7 How land auctions have facilitated growth of rental prices?

We find indications that obligatory state-owned land auctioning procedures have substantially contributed to the growth of land rental prices for agricultural land. Unfortunately, the number of auction participants, the key information on auctions' competitiveness, has not been made available by the SGC. However, some indirect evidence provides some clues about why auctions help filling state budget by maximizing rental prices. In particular, we find a substantial increase in the difference between the real starting and final rental prices (Figure 6). In 2013 auction-induced markup on the starting price was modest (only 15% of the starting price) with the majority of lots auctioned with a markup

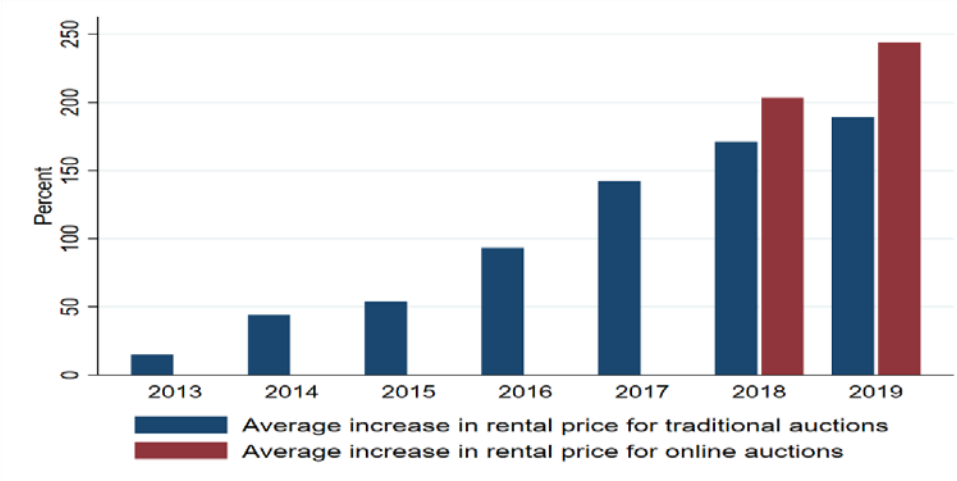

Figure 6. Dynamics of the auction markup as a share of the starting price.

less than 100 UAH. The difference between starting and final price grew dramatically in the consecutive years reaching almost 200% for traditional auctions in 2019. These dramatic price increases may on the one hand reflect tenants' higher value of marginal product of land in comparison to the starting auction prices. On the other hand, we may also observe a period when market stakeholders learned how auctioning system works.

We find that online auctions have contributed more to final rental price increases than their traditional counterparts. In particular, the increase in rental price as a share of starting price was significantly larger in 2019 for online auctions.[10] Interestingly, observing the markup in monetary terms (Appendix A), we see that there is no statistical difference between the markups for online and traditional auctions. This is because, as mentioned above, the NMV of the plots put for online auctions was considerably lower.

The pattern of the markup distribution is similar to the final rental prices presented above (Figure 7). We observe more than three-fold average increase in rental prices in Ternopil (311% increase), Vinnytsia (392% increase), and a record of 672% in Chernivtsi oblast. This regional difference in markups could be due to more demand for rental land in these oblasts or an indication of an inconsistent NMV. For a better understanding, a multivariate analysis would be necessary. Auction-induced markups in Eastern oblasts appears to be substantially smaller.

In sum, our evidence suggests that land auctions could be considered an effective tool to raise land rental prices from the percentage of NMV set by tax- and land-related legislation to the real market value. In other words, observed increases in the rental prices represent an indirect evidence about the inconsistency between the rental rates derived from the NMV and the real market rental price derived from the expected profitability of agricultural land.

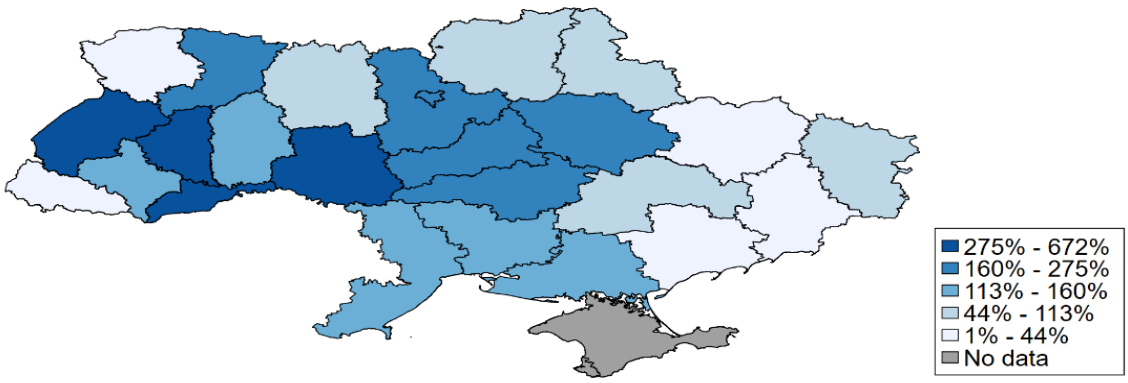

Figure 7. Distribution of the auction markup as a share of the starting price in 2018.

[10] P-value of the t-test for a comparison between the markup in 2018 and 2019 is 0.0067.

4 DETERMINANTS OF LAND RENTAL PRICES IN UKRAINE

4.1 Model setup

Here, we develop a simple econometric model to estimate the influence of plot and auction characteristics that may affect land rental prices. In particular, our model belongs to the family of hedonic models where plot characteristics affect the renter's/bidder's willingness to pay for that particular plot (Maddison, 2000; Palmquist & Danielson, 1989). As dependent variables, we use the logarithms of the final price and the difference between the starting and the final price (markup).

A key explanatory variable should be some measure of attractiveness of the plots (e.g. soil quality). A natural candidate for this is NMV as it reflects both, soil quality and economic attractiveness. However, we have complete data on NMV only for 2019. We thus present two types of specifications: one with 2019 sample only with NMV as an explanatory variable and one with the full sample without NMV. This way we can also test the effect of the contract length because we have more variation throughout the sample as opposed to 2019 where a vast majority of contracts was signed either for seven or for 10 years. The logic of including contract length is that longer contracts may be more attractive to the bidders as they may reduce average transaction costs of rental contract maintenance and additionally provide higher planning security for the enterprise as a whole.

Another key explanatory variable is the size of a land plot. Legal maintenance of rental contracts of larger plots may be cheaper as it may reduce the average transaction cost of land portfolio maintenance. In addition, we use two dummies to control for the land use type: dummy for individual farming and for hayfield and pastures. Both of these variables are defined in accordance with the Classification of land use purposes adopted on November 1, 2010. We would expect the rental prices to be higher for the former and lower for the latter. However, these effects should be absorbed by the NMV in the specification with the 2019 sample because NMV should reflect the respective value of these plots.

Some institutional features of the auctions may affect competition for a particular land plot. First, we include the logarithm of the guarantee contribution. Although it should be set at 5% of the yearly rental payment, we find a large variation in terms of its size within our sample. The logic is that larger guarantee contributions may deter some potential auction participants that would lead to lower competition as a result. Second, auctioning a large plot offered in several separate lots may reduce the attractiveness of this land as the transaction costs of contract maintenance increase with the number of contracts. To reflect these circumstances, we include the number of lots put on a given auction where a given lot is auctioned. It is nevertheless important to mention that we cannot guarantee that land plots rented out within one auction were adjacent.

To estimate the model, we use Ordinary Least Squares (OLS) regressions. Endogeneity problems are unlikely because we observe a clear sequence of events related to auction organization that result in final rental prices.

4.2 Results

Before turning to the estimations of the determinants of the rental prices, let us examine the descriptive statistics of the dependent and independent variables that are used in the regressions (Table 2). The rental prices appear to be very broadly distributed even after dealing with the outliers.[11] The duration of the rental contracts range from 1 to 50 years with more than 50% clustered around seven year period. We observe this because of the substantial reduction and stabilization of contract lengths after 2016. In 18% within our sample the auctions were conducted online because they were introduced in 2018 and were broadly conducted in 2019. The size of the land plots auctioned varies from 0.01 ha to 1,318.4 ha. We have a very small number (0.34% or 124 plots) of land plots representing hayfields or pastures and ca. 3.8% of plots designated for family farming. Interestingly, the SGC initiated 73% of the auctions in our sample. However, this share has been declining recently reaching 58.01% in 2019. Thus, ATCs are playing an increasingly important role in public land management.

Table 2. Descriptive statistics.

	Mean	**Min**	**Max**
Final rental price per ha (2018 UAH)	3,401.91	36.06	328,868.7
Number of years the contract was sign for	9.91	1	50
Online auction (1-yes; 0-no)	0.18	0	1
Size of the land plot (ha)	18.85	.01	1,318.4
Auction initiated by the SGC (1-yes; 0-no)	0.73	0	1
Land plot is a pasture or a hayfield (1-yes; 0-no)	0.0034	0	1
Land plot is for personal farming (1-ye 0-no)	0.038	0	1
NMV (2018 UAH)*	24,316	379	1,433,658
Number of lots within an auction	5.81	1	20
Guarantee contribution (2018 UAH)	922.44	0	8824.63
Markup in 2019 (2018 UAH)	1,894.76	0	177,303.2
Markup for the whole sample (2018 UAH)	1,478.80	0	326,566.1

*Note: Data available only for 2019 and partially for 2018.

[11] We use the approach based on the interquartile range suggested by Tukey (1977).

Table 3 presents the estimations of the final rental prices and the difference between the starting and final prices (markup). An immediate observation is that more attractive plots (with higher NMV) are predicted to result in higher final price and a higher markup. In the full-sample specification, we find a negative and significant coefficient for the dummy for hayfields and pastures because the effect is no longer captured by the NMV in this specification.

Contract length appears to play little role in our sample because most of the coefficients are insignificant. We do not find any effect in the 2019 sample because there is little variation as a vast majority of contracts (84.3%) were signed for 7 years and 10.7% for 10 years. For the full sample, there appears to be no effect on the final price. However, we find evidence that longer contracts are more likely to be associated with larger markups and this effect loses its strength as the contract length grows. In other words, longer rental contracts may generate more competition for a given land plot.

Another important finding is that larger plots appear to exert a positive effect on our outcome variables as they may be more attractive for potential renters. We find positive and significant coefficients in each specification except for the model (3) where the coefficient is very close to zero and is insignificant.

Concerning the variables related to how particular plots are rented out, we find that auction setup is important for the final price and the markup. First, guarantee contribution appears to be a deterrent for some potential participants in 2019 as we find a negative effect on our dependent variables. However, this variable (guarantee contribution) is insignificant for the full sample. Because the guarantee contribution should be set as a 5% of the starting rental price, the variation may be insufficient to establish a statistical relationship. Second, in line with our expectations, we find the number of lots within an auction to be negatively related to our dependent variables in all the specifications. Thus, higher transaction costs of maintaining several contracts instead of one may deter potential auction participants.

Table 3. Estimations of price and markup determinants.

	Only 2019 sample		Full sample	
	Log of final price (2018 UAH) (1)	Log of markup (2018 UAH) (2)	Log of final price (2018 UAH) (3)	Log of markup (2018 UAH) (4)
NMV (2018 UAH)	0.739***	0.644***		
	(0.000)	(0.000)		
Contract length (years)	0.012	0.049	0.002	0.049***
	(0.324)	(0.185)	(0.693)	(0.000)
Contract length squared	-0.000	-0.001*	-0.000	-0.001***
	(0.126)	(0.089)	(0.911)	(0.000)
Plot size (ha)	0.082***	0.342***	-0.005	0.109***
	(0.000)	(0.000)	(0.656)	(0.000)
Land plot is a pasture or a hay-field (1-yesr; 0-no)	-0.179	-0.628	-1.116***	-1.476***
	(0.421)	(0.345)	(0.000)	(0.001)
Land plot is for personal farming (1-yesr; 0-no)	0.085	0.342*	0.051	0.078
	(0.190)	(0.088)	(0.282)	(0.505)
Guarantee contribution	-1.089**	-5.778***	-0.081	0.120
	(0.019)	(0.000)	(0.446)	(0.622)
Number of lots	-0.016***	-0.050***	-0.021***	-0.033***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	7.829**	37.517***	8.386***	3.858**
	(0.014)	(0.000)	(0.000)	(0.021)
Year dummies	No	No	Yes	Yes
Oblast dummies	Yes	Yes	Yes	Yes
Observations	3083	3058	12421	12209
R2	0.4765	0.1640	0.1292	0.1167

Note: Year and oblast dummies are not presented due to space limitations.

5 CONCLUSIONS AND DISCUSSION

This study provides an overview of the recent rental price developments for state-owned agricultural land in Ukraine. In the environment of missing land markets and a chronical lack of data, it is difficult to obtain an objective picture of the price dynamics on the land rental market. Because the data on private land rental is not systematically collected,[12] the only reliable source of information on land rental price is the publicly available data-base on land auctions for state-owned and communal land. Apart from the price dynamics and spatial distribution across Ukraine, we have analyzed the degree of competition for the state land and the role of the land auctions.

[12] Draft law No. 2194 from 01.10.2019 that was adopted in the first reading on 14.11.2019 aims to change this by requiring documentation of the private land rental price in the State Registry of Property Rights for Real Estate.

Although average rental prices for state-owned land have increased substantially in the period from 2013 to 2019, the demand for some land plots appears to be relatively low. Roughly, one fifth of all analyzed auctions did not take place because there were not enough participants. The demand may be insufficient either because the infrastructure for local agricultural production is insufficient or the lots may be not attractive enough. Unfortunately, the number of participants and the information on the individual bids for traditional auctions is not disclosed by the SGC as of yet. Consequently, it is difficult to estimate the extent of competition for the successfully auctioned land plots. Despite these circumstances, we find a substantial increase in rental price in comparison to the starting price. During 2018 and 2019 we observe roughly two-fold average increases in prices (in some oblasts the auction markup was more than three times larger than the starting price) suggesting that a substantial part of state-owned land was auctioned competitively.

We observe a price adjustment period between 2013 and 2016 and a stabilization thereafter. Rental prices grew substantially during the first period whereas the average length of the contracts went down. After the adjustment period, average rental prices for state-owned agricultural land have stayed just under 4,000 UAH (in 2018 UAH). Average rental periods also stabilized around 8.5 years per contract.

We also find higher rental prices in areas where we would expect more demand. The highest rental prices for state-owned agricultural land appear to be in the oblasts known for intensive agricultural production. In particular, we find that central oblasts demonstrate the highest average prices. Importantly, here we also find the highest auction-related markup with respect to the starting price suggesting that competition for land is relatively high.

In line with our expectations, we find higher final prices and markups for larger plots. This may reflect a higher demand for aggregate land as larger land plots may reduce average land transaction costs for agricultural enterprises. These transaction costs are associated with that fact that medium and large agricultural enterprises spend substantial resources to maintain their used land portfolios. Farms can potentially reduce costs associated with land portfolio maintenance by renting on average larger land plots. This could also improve production-related economies of scale (e.g. lower transportation costs between the plots).

Finally, we find that some institutional features of the auctions matter. For instance, we find higher guarantee contributions to be a deterrent for potential participants, which negatively affects the prices. Furthermore, renting out a parcel as separate lots may negatively affect the final price and the markup.

Two major implications may be derived from this study:

- First, there is a need for more transparency in collecting and reporting data related to land rental in general. Both land rental and sales markets require proper market monitoring and availability of price information to function properly. Information

on land prices for all market participants is especially important for the sales market. It can also be used as a basis for assessing the potential value of a given land plot. To be able to conduct analogous analysis with the private land, rental prices, together with additional features of an object in question (e.g. size, soil quality etc.), should be recorded in state registries and made publicly available with consideration of laws on confidential information.[13] Apart from that, the features of bidders and winners (farm size and type) should be anonymously disclosed, because it will help understanding the competitiveness of different farm types on the land market. More transparency will also make informal land cultivation more difficult and, as a result, improve local budget revenue performance.

- Second, the final price and, as a result, public revenues appear to depend on how a given land plot was auctioned. Auction organizers should carefully monitor local demand for land, which would help selecting appropriate plots to be auctioned. Special attention should be paid to formation of the parcels to offer attractive auction lots that generate high demand and competition. Understanding the determinants of the final rental price will help finding the balance between the goals of land distribution and budget revenue maximization.

[13] Currently, the Draft Law No. 2194 registered on 01.10.2019 and adopted in the first reading on 14.11.19 stipulates harmonization of information exchange between different registries. Furthermore, the Draft Law "On Amendments to the Land Code of Ukraine and Some Other Legislative Acts Against Raidering" No. 0858 adopted by the Parliament on December 5, 2019 stipulates mandatory reporting of sales and rental prices of each land plot.

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APPENDIX A. AVERAGE MARKUP FOR TRADITIONAL AND ONLINE AUCTIONS.

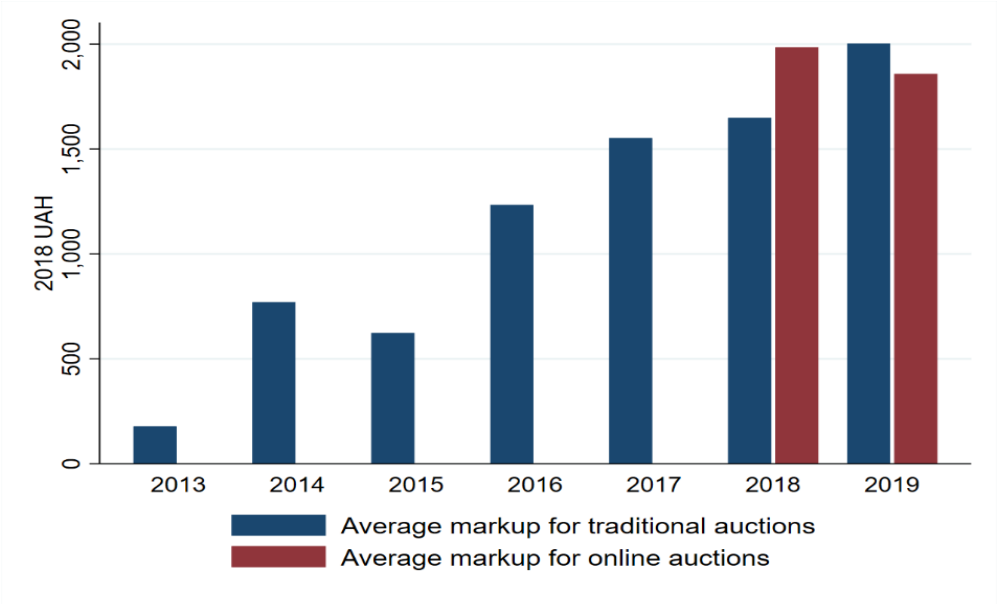

Figure 8. Average markup for traditional and online auctions.

APPENDIX B. NUMBER OF LOTS AUCTIONED VIA ONLINE AND TRADITIONAL AUCTIONS.

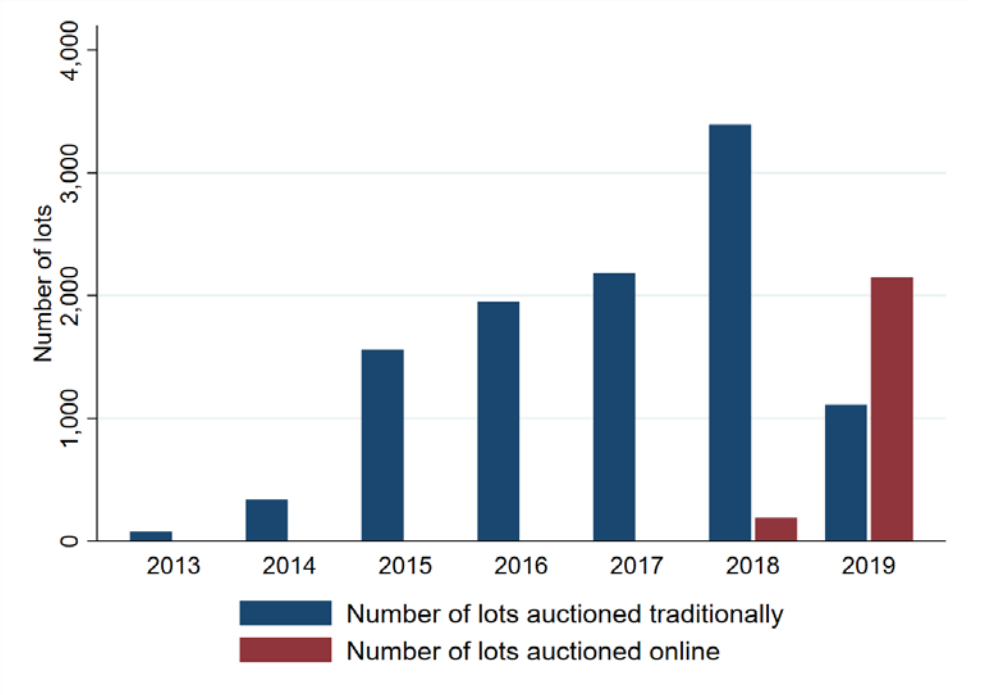

Figure 9. Number of lots auctioned via online and traditional auctions.